FINAL

Addendum 05

Smoky Canyon Mine
Remedial Investigation/Feasibility Study
Sampling and Analysis Plan

J.R. Simplot Company

October 2014 (Addendum 05)

Additional Wells Formation Aquifer Investigation in the Panel A Area

Prepared for:

J.R. Simplot Company
Smoky Canyon Mine
1890 Smoky Canyon Mine Road
Afton, WY 83110

P.O. Box 27, One Capital Center
999 Main Street, Suite 1300
Boise, ID 83707-0027

Prepared by:

Formation Environmental, LLC
2500 55th Street, Suite 200
Boulder, Colorado 80301

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 Overview

Additional Wells Formation groundwater monitoring is planned in the area east of Panel A. A new deep groundwater well, designated GW-29, will be installed in the area east of Panel A (Figure 1) in order to monitor groundwater conditions in the Upper Wells Formation aquifer east of the axis of the Boulder Creek Anticline. There currently is a lack of groundwater quality and water-level data in the Smoky Canyon Mine between the Panel A overburden disposal area (ODA) and lower Pole Canyon. Data collected from this proposed well and from other new wells in the area, will provide information on the groundwater flow conditions in the Wells Formation aquifer in this area. Well drilling and installation is planned to be completed in the fall 2014 with sample collection beginning following well development.

1.2 Additional Wells Formation Groundwater Sampling Objectives

As discussed in the Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS) Sampling and Analysis Plan (SAP) (Formation 2010), the objectives of the RI groundwater investigations are to ensure that sufficient data are available to adequately assess the nature, extent, fate, and transport of RI COPCs in the Wells Formation aquifer and the alluvial groundwater flow system at the Smoky Canyon Mine. Data collected from this proposed monitoring well to be installed east of Panel A (Figure 1) will be used to characterize groundwater quality and flow directions of the Upper Wells Formation aquifer east of the Boulder Creek Anticline.

The new well will monitor groundwater level and groundwater quality of the Wells Formation aquifer. Integral to the construction of a deep monitoring well will be the isolation and stabilization of any shallower water-bearing units encountered, including alluvial or colluvial deposits or bedrock formations above the Wells Formation. The well will be monitored to obtain water quality data within the Wells Formation aquifer.

1.3 Background Information

As detailed in the RI/FS Work Plan (Formation 2011), data are available for all of the existing Wells Formation monitoring wells for all RI COPCs. These data are available to be used for characterization of nature, extent, fate, and transport of COPCs. Additional analyses of RI COPCs will be performed for groundwater from this new Wells Formation well to be installed in 2014. Simplot plans to install one additional well (GW-29) in 2014 as part of the RI at a location east of the Boulder Creek Anticline axis and immediately east of Panel A.

The well installation methods that will be used to construct the new Wells Formation monitoring well are provided in Section 2.0. Specific data collection activities at the new well, along with analyses, are described in Section 3.0 and summarized in Tables 1 and 2, respectively. The location of the new Wells Formation monitoring well (GW-29), east of Panel A, will be established in consultation with the Agencies. Cultural resource information for the proposed monitoring well location is provided in Attachment 1.

Investigation of the Wells Formation aquifer and groundwater quality will include a variety of activities, as follows:

- Analyses of groundwater samples from the new monitoring well;
- Measurement of groundwater levels in the new Wells Formation monitoring well; and
- Additional evaluation of Wells Formation groundwater flow directions and hydraulic gradients in the area between the Panel A ODA and lower Pole Canyon (the aforementioned new monitoring well [GW-29] will provide information to support this evaluation).

The sampling methods that will be used for the additional Wells Formation groundwater investigation activities, listed above, are described in the following sections.

2.0 WELLS FORMATION MONITORING WELL INSTALLATION

One additional Wells Formation monitoring well will be installed east of Panel A (Figure 1) as part of the RI. Drilling and well construction methodologies described herein have been successfully used in the installation of numerous monitoring wells at the site, including deep wells installed in the Wells Formation. More detailed SOPs for well installation, completion, and development are referenced below and included in the full SAP (Formation 2010).

2.1 Location

The new monitoring well (GW-29) will be installed in the area east of Panel A at a specific location to be determined through consultation with the Agencies. Figure 1 shows the location proposed for this new well. The proposed location is east of the Boulder Creek Anticline axis and adjacent to Panel A. The well location will be on public land administered by the U.S. Forest Service and leased to Simplot under Lease Number 015259. The new well will be designated GW-29.

The well will be designed to screen the uppermost saturated zone in the Wells Formation aquifer, consistent with the other monitoring wells currently in use at the Site.

2.2 Drilling and Logging

A drilling contractor with experience drilling in the geologic conditions present at the Site will be used. The driller will be selected based on cost, technical expertise, and knowledge of the local geology. The bedrock boring for the deep well will be drilled using percussion-hammer, rotary (air, wet or mud), or a combination of drilling methods. The method ultimately used will be selected based on the driller's experience with the rock type and conditions present in the area. For example, the unconsolidated deposits may be drilled more efficiently with rotary methods, while the percussion hammer may be most efficient for the bedrock strata. Most percussion-hammer drilling rigs are capable of both percussion and rotary methods. Initially, the drilling will use air or water as the circulating media to return cuttings to the surface. In some conditions, other fluids or additives may be needed. A discussion of the use and management of such fluids and additives is included in NewFields SOP No. 23, Installation of Deep Bedrock Monitoring Wells and Piezometers (SAP, Formation 2010).

The deep boring will be advanced at least 50 feet into the saturated portion of the Wells Formation if unconfined conditions are encountered. If confined conditions are encountered, the boring will be advanced to the depth necessary to accommodate the most appropriate well screen and well sump length. The total depth of the boring is anticipated to be about 700 feet or more.

Drill cuttings from the deep bedrock borehole will be collected and logged on 5- to 10-foot intervals for lithologic and stratigraphic evaluation. Drilling and logging procedures will be performed in accordance with MFG SOP No. 4JRS, Supervision of Exploratory Borings (SAP, Formation 2010). Chemical analysis of the bedrock cuttings will not be required. Samples of any materials placed in the borehole during well drilling to assist in maintaining circulation or borehole stability may be collected and archived at the Site. The samples can be analyzed to

help resolve any questions should the groundwater sample results raise issues that could be attributed to these materials.

Any water-bearing stratigraphic units encountered above the Wells Formation will be isolated by cementing steel casing in place. It may be necessary to provide more than one casing string to achieve the total drill depth depending on borehole stability. Borehole diameter will be at least 3 inches larger than the casing diameter where the casing is to be cemented into place. Casing will be cemented with Portland Cement Type I/II placed by pumping with tremie pipe until grout is returned to the surface in the annular space between the casing and borehole wall. The well design and procedures for installation of the deep monitoring well are described below.

2.3 Deep Monitoring Well Design and Installation

The following goals need to be considered in the selection of an appropriate well design that will meet the monitoring objectives:

1. Provide detection of changes in groundwater quality in the uppermost portion of the aquifer.
2. Accommodate seasonal and yearly fluctuations in groundwater levels.
3. Isolate shallow water-bearing units encountered above the major aquifer in the Wells Formation.
4. Accommodate a variety of submersible groundwater pumps.
5. Allow flexibility in depth of sample collection.
6. Provide durability and reliability for long-term use to support groundwater monitoring programs.

The following well-screen design addresses the monitoring objectives listed above:

Well Screen Length – The well screen will be installed within the saturated portion of the aquifer. If the aquifer is locally unconfined, the screen will be extended above the water level. If the aquifer is locally confined, the screen will be restricted to the water-bearing zone. The specific length of the well screen will be based on the conditions observed during drilling and is estimated to be approximately 50 feet. A 50-foot well screen will encompass the intervals above and below the 20-foot zone typical of the annual fluctuation of groundwater levels in the Wells Formation aquifer.

Well Screen Diameter – The well screen diameter will be 4 inches. This allows for a variety of pumps to be used for well development, well testing, and groundwater sampling.

Well Screen – Continuous-slot, stainless steel, with an opening of 0.020 inches, will be used for well screen. This slot size provides a large open area for flow through the screen and maximizes the efficiency of the connection between the well and the formation.

Well Casing – All blank well casing installed above the screen interval will consist of stainless steel to a point 60 feet above the well screen or the anticipated high water level, then with low-carbon steel to the ground surface.

Filter Pack – Filter Pack 1 (10-20 silica sand) will be placed between the screen and formation to provide annular stability and filtration and will be extend approximately 10 feet above the screened interval. This size of filter pack may not provide optimum filtration of some of the fine-grained sand present in the Wells Formation at high entrance velocities, but this should not cause problems at the lower velocities typically encountered during sampling. Filter Pack 2 (20-40 silica sand) will be placed above Filter Pack 1 and below the bentonite seal and will be approximately 2 feet thick.

In summary, the well will be constructed from 4-inch-nominal-diameter, low-carbon steel casing, stainless steel casing above the well screen to a level 60 feet above the anticipated high groundwater level, stainless-steel screen, and a sump. A schematic well completion diagram for the proposed monitoring well based on installation in unconfined conditions is shown in Figure 2.

The deep well will be constructed and installed in accordance with the Site-specific procedures presented in NewFields SOP No. 23, Installation of Deep Bedrock Monitoring Wells and Piezometers (SAP, Formation 2010), which are briefly summarized here.

The casing and screen will be centered and hung in the borehole. Centralizers will be used as needed. The well string will be held under tension in order to prevent crushing of the screen and to keep the well plumb until seal placement has been completed. The filter pack described above will be installed to a level above the well screen that is appropriate based on the specific conditions observed during drilling. The height of the filter pack above the screen will ultimately be dependent on the presence or absence of water-producing zones above the screen. As was stated above as a performance goal, the well design and construction should “isolate shallow water-bearing units encountered above the major aquifer in the Wells Formation.” A bentonite seal consisting of bentonite chips, bentonite pellets, or high solids bentonite grout will be used from the top of the sand filter to within 40 feet of the surface to provide an annular seal. The remainder of the annular space between the borehole and the well casing will be filled with a cement grout. All grout will be placed using a tremie pipe.

The well will be completed above the ground surface with a steel surface casing and locking lid to protect the well. The Forest Service will be provided with duplicate keys for all wells completed on Forest Service land. Weep holes will be drilled in the base of the steel surface casing just above the ground surface to allow water to drain from inside the outer casing and prevent ice build-up. A 4-foot-diameter, 1-foot-thick gravel pad will be placed around the well. The well will be surrounded by three concrete or steel posts, each 3 feet high, to protect the well head from collisions or other disruptions (refer to NewFields SOP No. 23 [SAP, Formation 2010]).

After well installation is complete, a dedicated pump system will be installed for use in routine purging and sampling. Dedicated tubing affixed to the pump will facilitate sampling, which also will require use of a truck-mounted generator to power the dedicated pump.

2.4 Well Development

The primary purpose of the well will be the collection of water quality samples; the well will not be used for water supply. Therefore, extensive development to remove turbidity associated with high pumping rates and significant well and aquifer stress will not be needed. Instead, the purpose of the development will be to remove water from the well potentially affected by drilling and to minimize the potential turbidity in the well associated with the normal sample collection pumping rates.

A minimum of 24 hours shall elapse after well construction and before well development. The development program will be implemented without the use of dispersing agents, acids, etc.

Development will consist primarily of a combination of air lifting and pumping. If groundwater yield from the well is sufficient, over pumping will be used to optimize development. Surging with a surge block and bailing may also be performed, if necessary and practical. The development method will ultimately be selected by the field personnel and will depend on specific conditions encountered during drilling or well installation. Temperature, pH, conductivity, and turbidity will be monitored during development. Development will continue until the groundwater removed from the well is reasonably clear and free of sediments and the well produces water with stable field parameter readings (i.e., temperature, pH, conductivity). NewFields SOP No. 7, Monitoring Well Development (SAP, Formation 2010).

During development pumping, groundwater level and pumping rate will be monitored frequently. This information can be used to assess the bulk hydraulic properties on the saturated portion of the screen interval, assess the productivity of the well, and assist in the final selection of a sampling pump.

2.5 Surveying

The location and elevation of the new well will be surveyed using conventional land surveying methods. The horizontal locations of the well will be surveyed to the nearest 0.1 foot using the State Plane coordinate system. The well elevation will be surveyed to the nearest 0.01 foot at both the ground surface and at a marked location (measuring point reference elevation) on the inner well-casing riser.

Upon completion of the new monitoring well, a deviation survey may also be performed to measure any deviation of the well position from a vertical angle. The need for deviation survey(s) will be determine after static water levels have been measured in each well and in consultation with IDEQ and the Forest Service.

3.0 WELLS FORMATION GROUNDWATER SAMPLING PROCEDURES AND ANALYSIS

3.1 Monitoring Locations and Frequency

Groundwater monitoring and sampling at the proposed new well location (GW-29) in support of the RI will be conducted quarterly for one year, beginning at least one month after well development.

3.2 Water Level Measurements

Water levels will be measured continuously through the use of a transducer that will be installed in the new monitoring well (GW-29). A data logger will record the water levels measured using the pressure transducer, and data will be downloaded at each monitoring location at least quarterly.

3.3 Inspection and Purging

Before each sampling event, the well to be sampled will be inspected and purged to help ensure that representative samples are collected. The wellhead will be inspected to ensure that the lock, protective cover (hinges), and well cap are in good condition and working order. The steel casing and well cap should be clean of any dust or moisture prior to opening the well. When water level data are collected prior to well purging and sampling, the depth to water and the total well depth will be measured.

A dedicated, pneumatic piston pump (or equivalent) and low-flow methods will be used for purging and sampling of the new deep Wells Formation monitoring well (GW-29). Well purging will use procedures consistent with those described in JRS SOP No. 4, Groundwater Sampling and Water-Level Measurements at Monitoring Wells and Piezometers (SAP, Formation 2010), as briefly summarized below.

When low-flow purging is used, the well will be purged at a low pumping rate to minimize agitation of water in the well and minimize drawdown. The goal is to limit drawdown in the well to less than 10 percent of the length of the saturated well screen. If the initial water level is above the top of the screen, then the goal is to limit drawdown due to purging so that the water level in the well does not drop below the top of the screened interval. When conventional purging must be used, the well will be pumped or bailed at least until the volume of water removed is equal to three casing volumes (volume of standing water in the well based upon total depth of well, the depth to water, and the well casing diameter).

To ensure that water samples are representative of the water-yielding zone, periodic measurements of the temperature, pH, and conductivity will be made during purging. Turbidity, dissolved oxygen, and redox potential will also be measured periodically and immediately prior to sample collection as described in the sample collection discussion below. The sample will be collected only when the temperature, pH, and conductivity reach a relatively constant value during purging (±10 percent for temperature and conductivity, and ±0.5 pH units) or after three well volumes have been removed. If the yield of the well is low such that it can be bailed or pumped dry, then the recharged groundwater in the well will be considered representative

regardless of the number of casing volumes of groundwater removed, because all standing water in the well has been replaced by recharge from the water-yielding zone.

3.4 Sample Collection

Groundwater samples will be collected after purging is complete and using the same equipment as used for purging. Groundwater samples will be submitted for analyses listed in Table 2. At the same time that samples are collected for laboratory analysis, pH, conductivity, turbidity, dissolved oxygen, redox potential, and temperature measurements will be made using field instruments capable of the precision specified for these parameters in the RI/FS QAPP (Section 2 of the SAP [Formation 2010]). Field measurements of ferrous iron and total iron (for calculation of ferric iron) will also be performed and recorded at the time of sample collection. Field parameter measurement and calibration protocols are detailed in JRS SOP No. 5, Water Quality Sampling; MFG SOP No. 17, Field Measurement of Dissolved Oxygen; and MFG SOP No. 13, Field Measurement of Oxidation-Reduction Potential (SAP, Formation 2010).

Water level measurements will be taken daily, as conditions allow, during drilling and prior to well development. Continuous water-level measurements will be initiated for the RI as soon as possible after well development. After well development, an unfiltered sample will be collected and analyzed for RI COPCs, including major cations/anions. Then, at least one month after well development, samples will be collected quarterly and analyzed for the full list of RI COPCs (Table 2).

Groundwater sampling procedure details are included in JRS SOP No. 4, Groundwater Sampling and Water Level Measurements at Monitoring Wells and Piezometers. A general description of the sampling procedure follows.

Sample bottles will be prepared specifically for the required analyses by the analytical laboratory, and they will be filled with sample water taken directly from pump tubing (or by pouring from the bailer). The sample bottles and preservation techniques used will be as described in the QAPP. For the filtered samples, groundwater will be pumped through a 0.45 µm in-line, high-capacity filter. The in-line filter will be purged with approximately 200 mL of sample water before the laboratory container is filled. Filters and tubing will be used for only one sample and subsequently disposed.

Field quality control procedures and quality control sample types associated with groundwater sampling activities are described in the QAPP (Section 2 of the SAP [Formation 2010]).

3.5 Sample Preservation, Handling, and Analyses

Groundwater samples collected for laboratory analysis will be preserved as noted in Table 3 and handled in accordance with JRS SOP No. 2, Sample Custody, Packaging and Shipment (SAP, Formation 2010). Each groundwater sample collected as part of the groundwater monitoring task will be submitted for the analyses listed in Table 2, which includes the most recent SW-846 test methods. The samples will be analyzed in accordance with the laboratory procedures specified in the QAPP (Section 2 of the SAP [Formation 2010]).

Groundwater samples collected in support of the RI will be assigned a unique sample identification number in accordance with procedures identified in the QAPP. Each sample identifier will also include general sampling event, location, media type and sample type designations, as follows:

Sampling Event - Location - Media and Type - Number

SC0514-GW29-GW201

The first field in the identification number identifies the general sampling location and time period. For example, samples collected in October 2014 will all have the prefix “SC1014.”

The second field in the identification number identifies the location of the sample, for example GW-29.

The third field has three parts. The first part is a two- or three-letter acronym that identifies the sample matrix type. Groundwater samples are designated matrix type “GW.”

The second part of the third field is comprised of a single digit describing the intended sample use. These sample-use codes include:

0: primary sample

2: field duplicate sample

3: equipment rinsate or QA/QC blank sample

Note that additional codes may be added as the project proceeds. The additions will be communicated immediately to the field staff and data management team.

The third and final part of the third field is a two-digit number unique to the specific sample. Numbers will begin with 01 and increase consecutively as sampling tasks are implemented.

For example, SC1014-GW29-GW201 is a duplicate groundwater sample collected from location GW-29 in October 2014 with the sequential number 01 (i.e., the first groundwater sample collected at that site during that sampling event).

Samples will be immediately labeled in the field and sample numbers shall be recorded at the time of sampling in field notes and on field data collection forms.

4.0 REFERENCES

Formation. 2011. Final (Rev03) Remedial Investigation/Feasibility Study Work Plan, Smoky Canyon Mine. Prepared for J.R. Simplot Company, May.

Formation, 2010. Final Smoky Canyon Mine Remedial Investigation/Feasibility Study Sampling and Analysis Plan. Includes Quality Assurance Project Plan (QAPP), Field Sampling Plan (FSP) and Standard Operating Procedures (SOPs), and the Health and Safety Plan (HASP). Prepared for J.R. Simplot Company, June.

TABLES

TABLE 1. REMEDIAL INVESTIGATION FIELD AND DATA COLLECTION ACTIVITIES FOR 2014
(SAP Addendum 05, October 2014)

Groundwater Data Gaps	Investigation Activity Description	Sampling or Measurement Locations	Planned Monitoring and Sampling Frequency and Duration
Additional evaluation of Wells Formation groundwater flow directions and hydraulic gradients	Monitoring Well Installation	New monitoring well GW-29	Install new well
Analyses of groundwater during and immediately after installation of the new Wells Formation monitoring well	Wells Formation Potentiometric and Groundwater Quality Monitoring	New monitoring well GW-29	When uppermost Wells Formation water is encountered, collect water sample (if possible) and analyze for RI COPCs (dissolved), including major cations/anions. After well development, collect an unfiltered sample and analyze for RI COPCs, including major cations/anions.
			Water quality sampling quarterly for one year, beginning at least one month after well development; analyze for RI COPCs, including major cations/anions (see Table 2 of SAP Addendum 05).
			Daily water level measurement, as drilling and borehole conditions allow, prior to developing the well. Continuous groundwater level measurements after the well has been developed using a pressure transducer and data logger.

TABLE 2. GROUNDWATER MONITORING PARAMETERS
(SAP Addendum 05, October 2014)

Parameter	Analytical Method	Reporting Limit (mg/L)
Field Measurements		
Depth to Water	Water Level Indicator	---
Temperature	digital thermometer	---
pH	field electrode/pH meter	---
Specific conductance	field conductivity meter	---
Turbidity	field turbidity meter	---
Dissolved oxygen	field DO meter	1 mg/L
Oxidation-reduction potential	field ORP meter	1 mg/L
Ferrous Iron	field spectrophotometer	0.3 mg/L
Total Iron (for calculation of ferric iron)	field spectrophotometer	0.3 mg/L
Metals[1]		
Aluminum	6010C	0.1
Antimony	6020A	0.003
Arsenic	6020A	0.003
Barium	6020A	0.001
Beryllium	6020A	0.0002
Boron	6010C	0.05
Cadmium	6020A	0.0002
Chromium	6020A	0.0015
Cobalt	6020A	0.001
Copper	6020A	0.001
Iron	6010C	0.06
Lead	6020A	0.003
Manganese	6020A	0.001
Mercury	7470A	0.0002
Molybdenum	6020A	0.001
Nickel	6020A	0.001
Selenium	6020A / SM 3114C	0.003 / 0.002
Silver	6020A	0.0001
Thallium	6020A	0.001
Uranium	6020A	0.001
Vanadium	6020A	0.0015
Zinc	6020A	0.005
Major Cations		
Calcium, dissolved	6010C	0.05
Magnesium, dissolved	6010C	0.10
Potassium, dissolved	6010C	0.5
Sodium, dissolved	6010C	0.5
Anions		
Chloride	300.0	0.2
Nitrate/Nitrite, as N	353.2	0.5
Sulfate	300.0	1.0
Other		
Alkalinity[2]	SM 2320B	1
Total Organic Carbon (TOC)	SM 5310B	1
Total Dissolved Solids (TDS)	SM 2540C	10
Total Suspended Solids (TSS)	SM 2540D	5

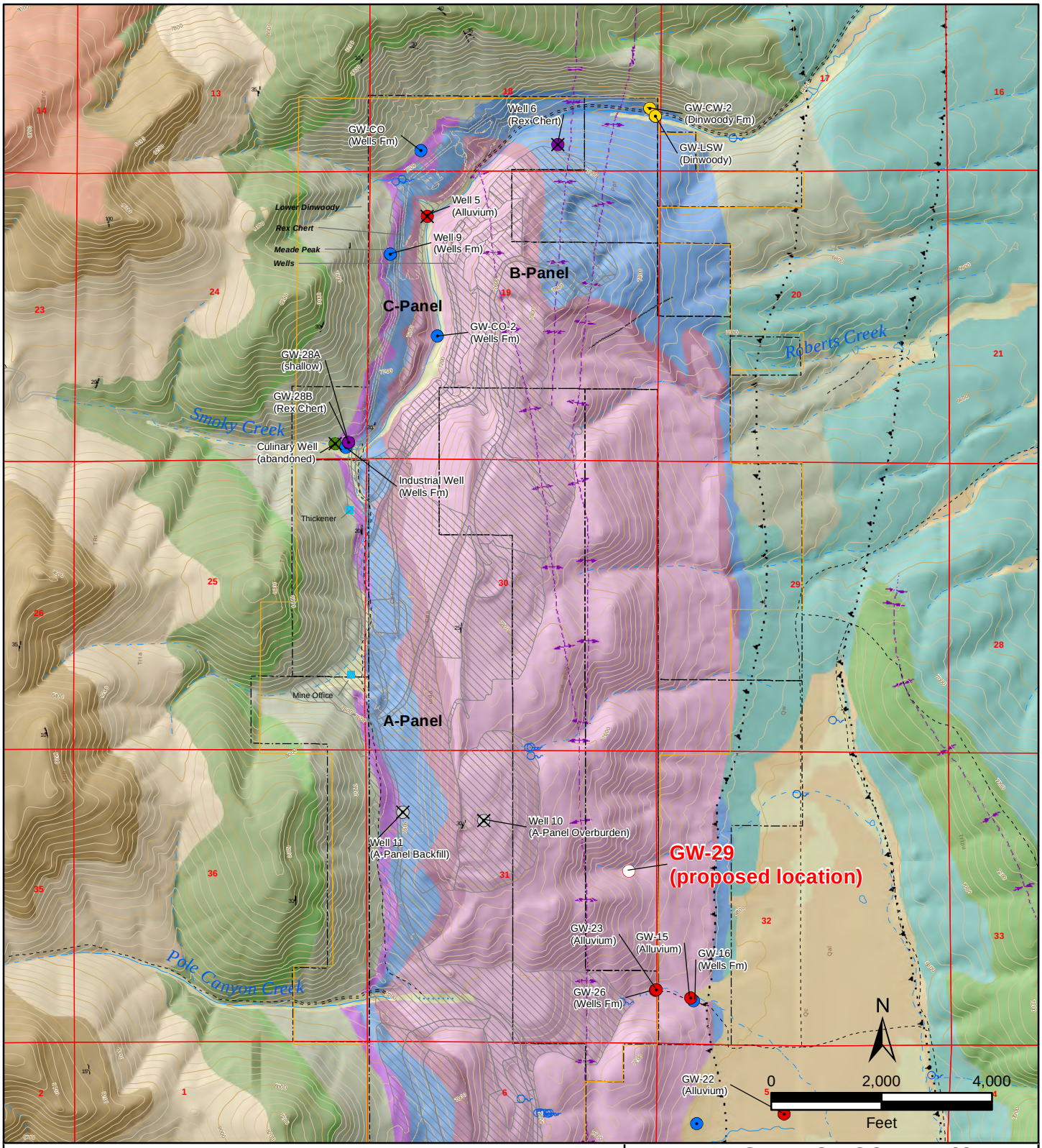
[1] Analyze total and dissolved concentrations.

[2] Alkalinity includes bicarbonate, carbonate, and hydroxide concentrations.

TABLE 3. SUMMARY OF SAMPLE PRESERVATION AND HOLDING TIMES
(SAP Addendum 05, October 2014)

Sample Type	Analyte	Preservation and Storage	Holding Time (days)
Groundwater	Total Metals (excluding mercury), Hardness	HNO_3 to pH < 2	180
	Dissolved Metals (excluding Mercury, including major cations)	Field filter, HNO_3 to pH < 2	180
	Total Mercury	HNO_3 to pH < 2, Cool at 4ºC	28
	Dissolved Mercury	Field filter, HNO_3 to pH < 2, Cool at 4ºC	28
	Alkalinity	Cool at 4ºC	14
	Nitrate/Nitrite	H_2SO_4 to pH < 2, Cool at 4ºC	28
	Sulfate	Cool at 4ºC	28
	Chloride	none required	28
	TDS, TSS	Cool at 4ºC	7
	TOC	H_2SO_4 to pH < 2, Cool at 4ºC	28

FIGURES



Legend

- Abandoned

Groundwater Wells

HydroUnit

- A-Panel External Overburden Dump
- A-Panel Pit backfill
- Alluvium
- Dinwoody Fm
- Meade Peak & Upper Grandeur Fm
- Rex Chert Mbr
- Rex Chert Fm; Wells Fm
- Wells Fm
- Mine Disturbance (2008)
- Lease and Special Use Boundary
- Mineral Lease Area / Active Mineral Extraction (AME) Area
- pt_SpringLocn_GIS

J.R. SIMPLOT COMPANY

SMOKY CANYON MINE

FIGURE 1

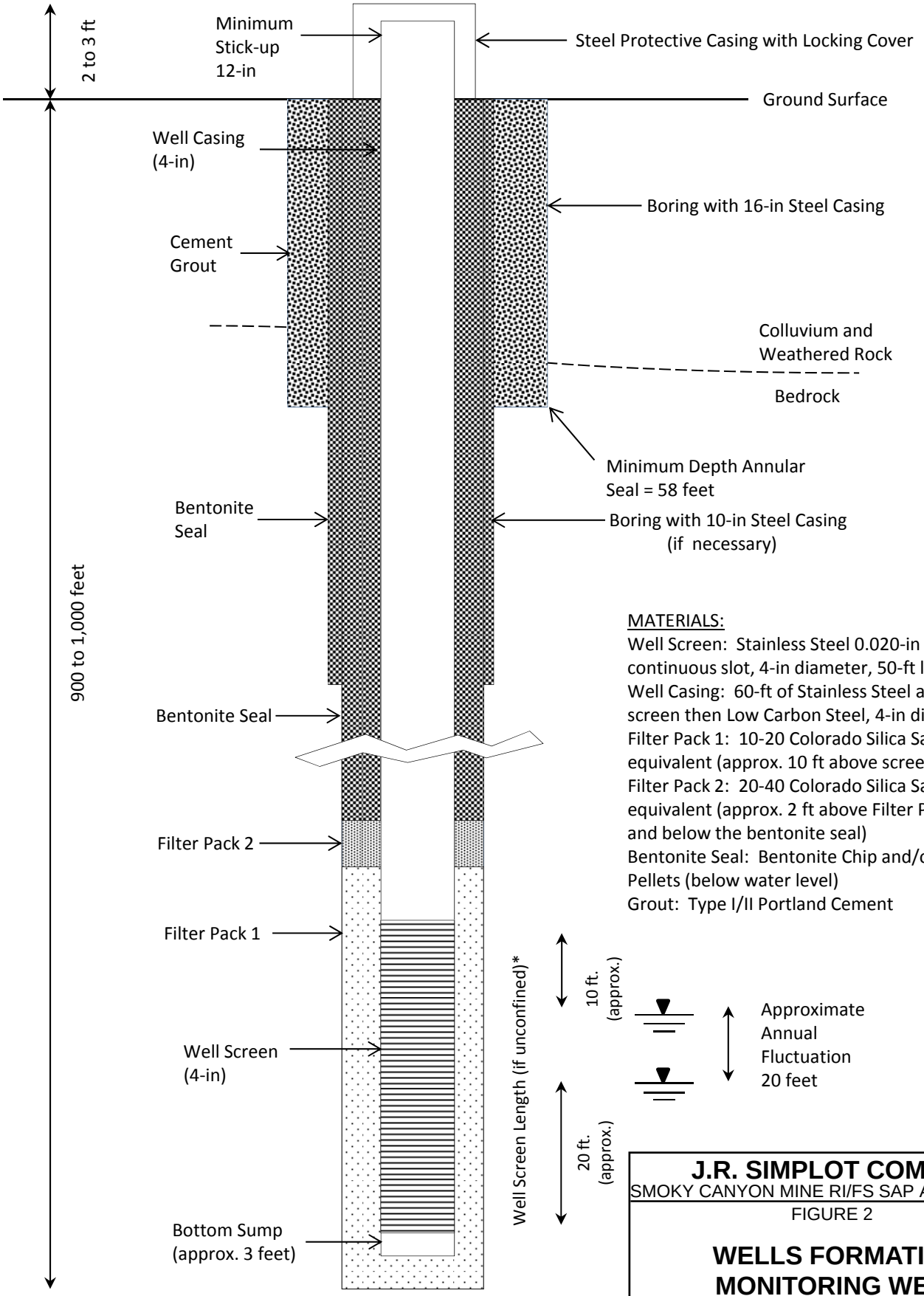
PROPOSED MONITORING WELL LOCATION (GW-29)

DATE: SEPTEMBER, 2014

BY: CRL | FOR: FLC

FORMATION ENVIRONMENTAL

S:\GIS\arcprj\20101109\plt\RIFS\SAPAddend\Fig1-1_GW29WellLoc.mxd



MATERIALS:
Well Screen: Stainless Steel 0.020-in continuous slot, 4-in diameter, 50-ft long
Well Casing: 60-ft of Stainless Steel above screen then Low Carbon Steel, 4-in diameter
Filter Pack 1: 10-20 Colorado Silica Sand or equivalent (approx. 10 ft above screen)
Filter Pack 2: 20-40 Colorado Silica Sand or equivalent (approx. 2 ft above Filter Pack 1 and below the bentonite seal)
Bentonite Seal: Bentonite Chip and/or Coated Pellets (below water level)
Grout: Type I/II Portland Cement

*Well screen length restricted to water bearing zone if confined conditions encountered

J.R. SIMPLOT COMPANY
SMOKY CANYON MINE RI/FS SAP ADDENDUM 5
FIGURE 2

WELLS FORMATION MONITORING WELL CONSTRUCTION DETAILS

DATE: SEPTEMBER 2014
BY: JPL FOR: FLC
FORMATION ENVIRONMENTAL

ATTACHMENT 1

An Intensive Level Cultural Resource Survey

for the

Proposed GW-29 Exploration Area,

J.R. Simplot East Smoky Panel, Caribou County, Idaho

(August 2014 Cultural Resource Report by Sagebrush Consultants

for Stantec Consulting Services, Inc.)

AN INTENSIVE LEVEL CULTURAL RESOURCE SURVEY FOR THE PROPOSED GW-29 EXPLORATION AREA, J. R. SIMPLOT EAST SMOKY PANEL, CARIBOU COUNTY, IDAHO

by

Sandy Chynoweth Pagano
Archaeologist

Prepared for:

Stantec Consulting Services, Inc.
8160 South Highland Drive, Suite A-4
Sandy, Utah 84093

Prepared by:

Sagebrush Consultants
3670 Quincy Avenue, Suite 203
Ogden, Utah 84403

Prepared Under the Authority of:

U.S.D.A. Forest Service, Permit for Archaeological Investigations
Authorization ID: SSC87 (exp. 12-31-2017)

Caribou-Targhee National Forest Report No. CB-14-689

Cultural Resource Report No. 2053

August 28, 2014

A. KEY INFORMATION

1. Project Name: An Intensive Level Cultural Resource Survey for the Proposed GW-29 Exploration Area, J. R. Simplot East Smoky Panel, Caribou County, Idaho.

2. Report number or associated federal project number (if appropriate): CB-14-689 Sagebrush Consultants Cultural Resource Report No. 2053.

3. Agency name (if 106-related): U.S.D.A. Forest Service, Caribou-Targhee National Forest

4. Report author (and principal investigator if different): Sandy C. Pagano and Michael R. Polk (principal investigator)

5. Date: August 28, 2014

6. County: Caribou County

7. Township, Range, Section (each township and associated sections listed separately):

T. 8S., R. 46E., Secs. 31 and 32 (Figures 1 and 2) on USGS 7.5' Quadrangle Sage Valley, Idaho-Wyoming (1980).

8. Acres Surveyed: 31.24 intensive (30-meter or less transect interval)
_____ reconnaissance (greater than 30-meter transect interval intuitive, or statistical sample)

B. PROJECT DESCRIPTION *(for 106-related surveys)*

1. Description of project and potential direct and indirect impacts to known or suspected historic properties:

In August 2014, Stantec requested that Sagebrush Consultants (Sagebrush) conduct a Class III cultural resource inventory of a proposed Simplot exploration area which includes two potential drill sites for a groundwater monitoring well, an adjacent observation well, and an access road in the Caribou-Targhee National Forest (CTNF) in Caribou County, Idaho. The exploration area for the GW-29 groundwater well drilling activities is approximately 31.24 acres, but the actual area of disturbance will be much less and fully contained in this proposed exploration area. Simplot will access this area and the proposed access road on the CTNF from their own private land and off of an existing access road. The proposed access road and drill site locations will be cleared and bladed to create a safe and stable working environment. Heavy mining equipment will be needed for the earthmoving activities.

2. *Description of Area of Potential Effects (APE) with reference to attached map*:

The project area consists of a rectangular block covering a total of 31.24 acres located in the CTNF in Caribou County, Idaho in T. 8S., R. 46E., Secs. 31 and 32 (Figure 2) on USGS 7.5' Quadrangle Sage Valley, Idaho-Wyoming (1980).

3. *Project acres*: 31.24 acres (12.64 ha.)

4. *Owner(s) of land in project area: (Key to map.)* U.S.D.A. Forest Service

C. STATEMENT OF OBJECTIVES FOR SURVEY *(Describe area to be investigated. Note the amount and kinds of archival and field information to be gathered with reference to historic contexts and property types that are expected. Be specific.)*

The present survey is being undertaken in order to identify, document, and evaluate the presence of prehistoric and historic cultural resources within the surveyed area in order to increase the known database and evaluate such resources for their eligibility to the National Register of Historic Places (NRHP), and to protect such eligible sites from potential destruction. Should sites be found during the inventory, they will be identified for avoidance. If that is not possible, data recovery measures will be proposed to mitigate the effects of the project on the site(s). Artifacts collected during the inventory will be deposited at the CTNF Supervisors Office.

D. LOCATION AND GENERAL ENVIRONMENTAL SETTING

1. *USGS topographic map(s):* USGS 7.5 Quadrangle Sage Valley, Idaho (1980)

Setting: (Describe landforms, topography, elevation, water, flora, fauna, mineral resources, etc. as they relate to human use.) The project area is located in southeastern Idaho on the eastern slope of the Webster Range, north of Pole Canyon, and west of Sage Valley. It is in an area known as the Southeastern Idaho-Wyoming Overthrust Belt within the Middle Rocky Mountain Province (McDonald 1983:II.1). The topography of the project area includes moderate to steep slopes of the eastern face of the Webster Range. The elevation of the project area is between 6,880 and 7,380 feet a.s.l. (above sea level). The nearest permanent water source is Tygee Creek, which is located 2700 meters northeast of the project area. Smoky Creek and Roberts Creek to the north, Sage Creek to the south, and numerous unnamed seasonal drainages and springs are also available water sources. Soils in the area consist of sandy loam with a small amount of angular and sub-angular gravels.

Surface visibility within the project area is low, averaging less than 20%. The proposed groundwater drilling exploration area lies within a heavily forested, hilly area. Vegetation includes typical alpine forest species such as Douglas fir, aspen, and various

shrubs and forbs. In portions of the project area the ground surface was completely obscured by dense vegetation and deadfall.

Natural disturbances in the area include erosion. Previous cultural disturbances in and near the project area consists largely of effects caused by phosphate mining activities, with the active Smoky Canyon Mine and ongoing exploration in the immediate vicinity.

E. PRE-FIELD RESEARCH

SHPO Record Search Number (provided by SHPO at the time of record search): #14352
1. Sources of information checked:
[ ] Overviews
[X] National Register
[X] Archaeological site records/maps
[X] Architectural site records/maps
[X] Survey records- ASI, Boise
[ ] Ethnographic studies
[X] Historical records/maps (list):
-GLO Plat Map for T. 8 S., R. 46E. (1903 and 1927); Boise Meridian, Idaho, US Bureau of Land Management, http://www.glorecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=ID|cty=|twp_nr=8|twp_dir=S|rng_nr=46|rng_dir=E|m=08#resultsTabIndex=0
-Idaho State Historic Preservation (SHPO) files
[ ] Individuals/groups with special knowledge (list)
[ ] Other (list)

2. Summary of previous studies in the general area: (Include titles, authors, year, report numbers, and study results. Relate to contextual themes where appropriate.) [ ] None

The search of the cultural resource files at the Idaho State Historic Preservation Office (SHPO) was carried out by Shannon Vihlene, Cultural Records Manager at the Idaho SHPO, on August 19, 2014. There have been 2 previously recorded sites (Table 1) and 16 projects completed (Table 2) within 1 mile of the project area.

Table 1. Previously Recorded Sites Within One Mile of the Project Area

Site Number	Agency Site Number	Description
10CU77	CB-34	Lithic scatter; flakes, points, biface, tooth enamel
10CU326	CB-468	Arborglyph

Table 2. Previous Cultural Resource Inventories Within One Mile of the Project Area					
Report Number	**Title**	**Author**	**Year**	**Agency**	**Project Number**
1989/5497	A Cultural Resources Snow Monitor of Four Proposed Drill Pads and Two Access Roads, Caribou County, Idaho. Sagebrush Archaeological Consultants, Ogden, Utah.	Polk, Michael	1987	BLM, Idaho Falls	20100612
1989/1519	Final Report: Intensive field study of archaeological resources at drill locations & proposed roads, Smoky Canyon Lease I-012890, J.R. Simplot Co., Fall 1978. Caribou National Forest	Druss, Mark	1978	Caribou NF	CRM-CB-19
1989/1520	Final Report-Stage I investigation & analysis of archaeological resources in pit area, mill sites, and dump site, Smoky Canyon Lease I-012890, J.R. Simplot Company, Summer and Fall 1979. Caribou NF	Druss, Mark	1980	Caribou NF	CRM-CB-61
1989/1521	Archaeological Survey, 161KV Transmission Line, Smoky Canyon Area. Caribou National Forest.	Druss, Mark	1982	Caribou NF	CRMB-CB-124
1989/1534	Archaeological Investigations in the Smoky Canyon Area, 1980. Caribou National Forest.	Druss, Mark et al.	1981	Caribou NF	Archives 20133345
1989/6883	Archaeological Investigations in Eastern Idaho: the Lower Valley Power and Light Tincup Loop Transmission Line Cultural Resource Survey. Caribou National Forest.	Walker, Danny	1982	Caribou NF	--
1989/1515	Survey Report #3, Smoky Canyon Project, 1981. Basin and Range Research, Pocatello. For Caribou National Forest.	Druss, Claudia and Steven Wright	1981	Basin and Range Research	CRM-CB-110
1993/224	Diamond Creek GIS Area. Caribou National Forest.	Christensen, B.	1991	Caribou NF	CB-91-0218
1994/167	Diamond Creek GIS Update. Caribou National Forest.	Robertson, M.	1993	Caribou NF	CB-93-306
1995/1034	Alan Linford Springs Development & Pipeline. Frank Fink, SCS Boise.	Robertson, M.		SCS Boise	NRCS95455
1997/664	Smoky Canyon Panel B Exploration,. Caribou National Forest.	Robertson, Mary	1997	Caribou NF	CB-97-434
1997/851	Simplot Smoky Canyon Phosphate Exploration BLM Report. BLM, Idaho Falls District.	Cresswell, Lisa	1997	BLM, Idaho Falls	ID-030-97-8
2002/622	Smoky Canyon Panels B&C. Prepared for J.R. Simplot Co., Boise, by Frontier Historical Consultants, Grand View, Idaho.	Gray, D.	2001	Caribou NF	CB-01-530
2006/557	Pole Canyon Removal Area, Frontier Historical Consultants, Grand View, Idaho.	Stratham, W.	2006	Caribou NF	CB-06-562
2010/552	Soda Springs Allotments Management Plan. Caribou N.F.	Hall, D.	2010	Caribou N.F.	CB-10-603
2013/527	JR Simplot Smoky Canyon Mine Diversion Channel, Caribou County	Pagano, Sandy and Michael Polk	2012	Caribou NF	CB-12-0655

3. Description and evaluation of projects in E.2 with regard to survey design, methods, personnel, and results: The previous surveys were considered sufficient to address cultural resource survey requirements for intensive-level studies at the time that they were performed.

F. EXPECTED HISTORIC AND PREHISTORIC LAND USE AND SITE SENSITIVITY

1. Are cultural properties known in this area? [X] No [ ] Yes (List site numbers and provide brief description of cultural theme represented by known cultural properties. Key to map.)

2. Are cultural properties expected? [ ] Yes [X] No (Why?)

Cultural resources are unlikely to be found in the project area due to the moderate to steep slopes and the dense vegetation throughout the project area.

3. What cultural themes/contexts are expected within the survey area? Check at least one theme in first two columns and at least one time period in the third column.

Theme		Time Period
[ ] Prehistoric Archaeology	[ ] Military	[ ] Prehistoric
[X] Agriculture	[X] Mining Industry	[ ] Historic Native American
[ ] Architecture	[ ] Native Americans	[ ] Exploration: 1805-1860
[ ] Civilian Conserv. Corp.	[ ] Politics/Government	[ ] Settlement: 1855-1890
[ ] Commerce	[ ] Public Land Mngt/Conserv	[ ] Phase I Statehood: 1890-1904
[ ] Communication	[ ] Recreation/Tourism	[X] Phase II Statehood: 1904-1920
[ ] Culture and Society	[ ] Settlement	[ ] Interwar: 1920-1940
[ ] Ethnic Heritage	[X] Timber Industry	[ ] Pre-Modern: 1940-1958
[ ] Exploration/Fur Trapping	[X] Transportation	[X] Modern: 1958-present
[ ] Industry	[ ] Other (list)	

Because of the steep slopes within the current APE, it is not expected that prehistoric or historic habitation sites will be found. However, stock grazing has been taking place in this general area for many years, and there is potential for hunting or herding related campsites and/or arborglyph sites within the survey area.

4. Brief description of where cultural properties associated with expected themes might be found with respect to landforms, water, vegetation, slope, fauna, and historical documentation:

Cultural properties such as a wood cutting areas, arborglyphs, historic trash scatters, historic access roads, and prehistoric isolated artifacts may be in the area, but campsites or structures are unlikely in the steep terrain. An unnamed road appears in Pole Canyon and several unnamed roads are on the 1903 and 1927 General Land Office (GLO) map of the area. None of these roads were located directly within the current project area.

G. FIELD METHODS

(Be specific and complete.)

1. Areas examined and type of coverage: (Describe actual methods used including transect interval and transect routes as shown on attached map. Justify any non-intensive survey.)

The survey corridor was walked in parallel transects spaced no more than 30 m apart. The project was walked beginning in the center of the survey area in generally north-south transects, other than the northeastern portion where transects were terrain based. Deviations from the transect lines around dense vegetation and fallen tress was also common. Although much of the project area was on steep slopes (>30%), the entire block area was surveyed. The project area is bisected by a previously surveyed mine exploration road. The road is currently being utilized by mining exploration operations.

2. Description of ground surface conditions: (Describe surface and subsurface visibility and factors such as vegetation or snow obscuring visibility. Specify percentage of surface that was visible.)

Surface visibility within the project area is low, averaging less than 20-percent. Vegetation includes typical alpine forest species such as Douglas fir, aspen, and various shrubs and forbs.

3. Areas not examined and reasons why: (Key to map.) N/A

4. Names of personnel participating in the survey <u>in the field</u>: Sandy Pagano

6. Dates of survey: The survey was conducted on August 27, 2014.

7. Problems encountered: [X] None

H. RESULTS

1. Listing of <u>all</u> cultural properties (including previously recorded) in this area: (Fully describe each on attached site forms and indicate precise location on attached USGS map.) [X] None

2. Summary of important characteristics of properties listed above: (Consider property type, integrity, age, cultural affinity of occupants, function, depth, and size.) N/A

3. Recommendations for National Register eligibility of each cultural property: (Specify both appropriate National Register criteria and contexts listed in F. Justify on attached site forms.) N/A

4. Recommendations for further investigations needed to evaluate cultural properties: N/A

5. *Cultural properties noted but not formally recorded: (Key to map.) [X] None*

I. CONCLUSIONS AND RECOMMENDATIONS

1. Brief summary of relevance of cultural properties to contexts listed under F, discussing potential contributions to these contexts: N/A

2. Discussion of potential threats to the integrity of the cultural properties and recommendations for future investigations or protective actions: N/A

3. For 106-related surveys, discussion of relationship of each cultural property to direct and indirect project impacts. Specifically state project's effect (no effect, no adverse effect, or adverse effect) upon each cultural property: [X] No properties

4. For 106-related surveys affecting cultural properties, discussion of avoidance or mitigation options for each property: N/A

5. For 106-related surveys, recommendations for additional information gathering or survey, avoidance measures, monitoring, mitigation, and future management: [X] None

If any additional cultural resources are encountered during the course of the project, the Forest Archaeologist will be notified immediately and all ground-disturbing activities will cease in that area until the Forest Archaeologist takes appropriate action in consultation with the SHPO.

J. ATTACHMENTS

(The following is only a checklist. All survey reports must include maps of the survey area showing survey transects, precise locations of <u>all</u> cultural properties, and, if 106-related, area of potential effects. All survey reports must include attached completed site forms [IMACS or equivalent forms for archaeological sites and architectural forms for structures and buildings] for each cultural property.)

1. Appropriate forms attached for each site?	[ ] Yes
2. Maps attached?	[X]Yes
3. Other attachments? (List)	[ ] Yes

General Location Map (Figure 1)
7.5’ USGS Project Area Map (Figure 2)

K. REPOSITORY

(Copies of all survey reports and site forms are located at the Idaho SHPO office. List where original survey records and attendant data will be located.)

Field notes are held on file by Sagebrush Consultants, at 3670 Quincy Avenue, Suite 203, Ogden, Utah 84403

L. CERTIFICATION OF RESULTS

I certify that this investigation was conducted and documented according to Secretary of Interior's Standards and guidelines and that the report is complete and accurate to the best of my knowledge.

Signature of Reporter

8/28/2014
Date

References Cited:

General Land Office (GLO)

1903 [Map for T. 10S., R. 45E.] Electronic Document, http://www.glorecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=ID|cty=|twp_nr=8|twp_dir=S|rng_nr=46|rng_dir=E|m=08#resultsTabIndex=0, accessed 8/26/2014.

1927 [Map for T. 10S., R. 45E.] Electronic Document, http://www.glorecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=ID|cty=|twp_nr=8|twp_dir=S|rng_nr=46|rng_dir=E|m=08#resultsTabIndex=0, accessed 8/26/2014.

McDonald, James A.

1983 *Targhee National Forest Cultural Resources Overview*. Manuscript, Targhee National Forest, St. Anthony, Idaho.

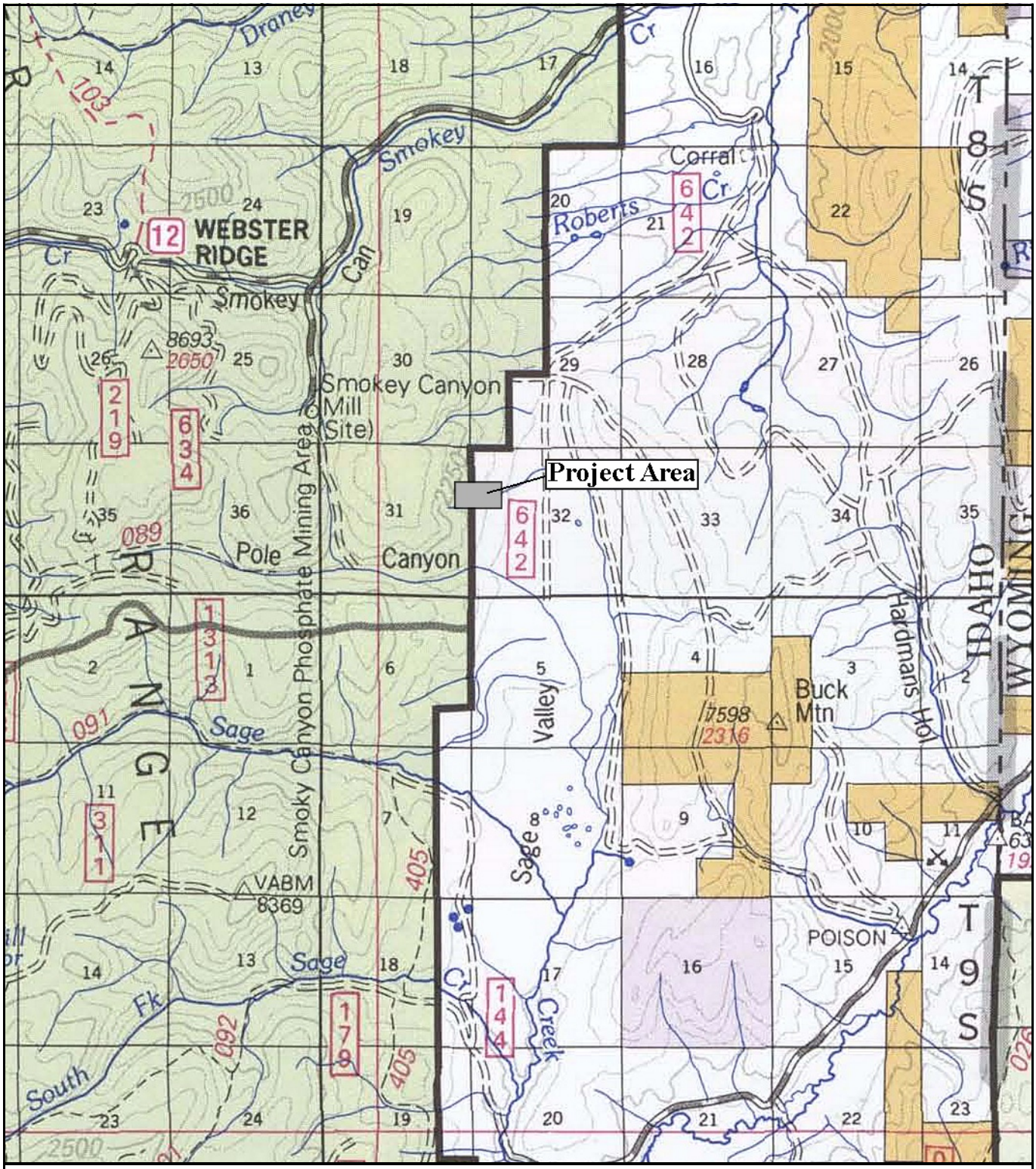


Figure 1. General Location Map. Taken from the USDA Forest Service Caribou-Targhee National Forests, Montpelier and Soda Springs Ranger Districts, Idaho (2006). Scale 1:126,720. USFS Report No. CB-14-689.

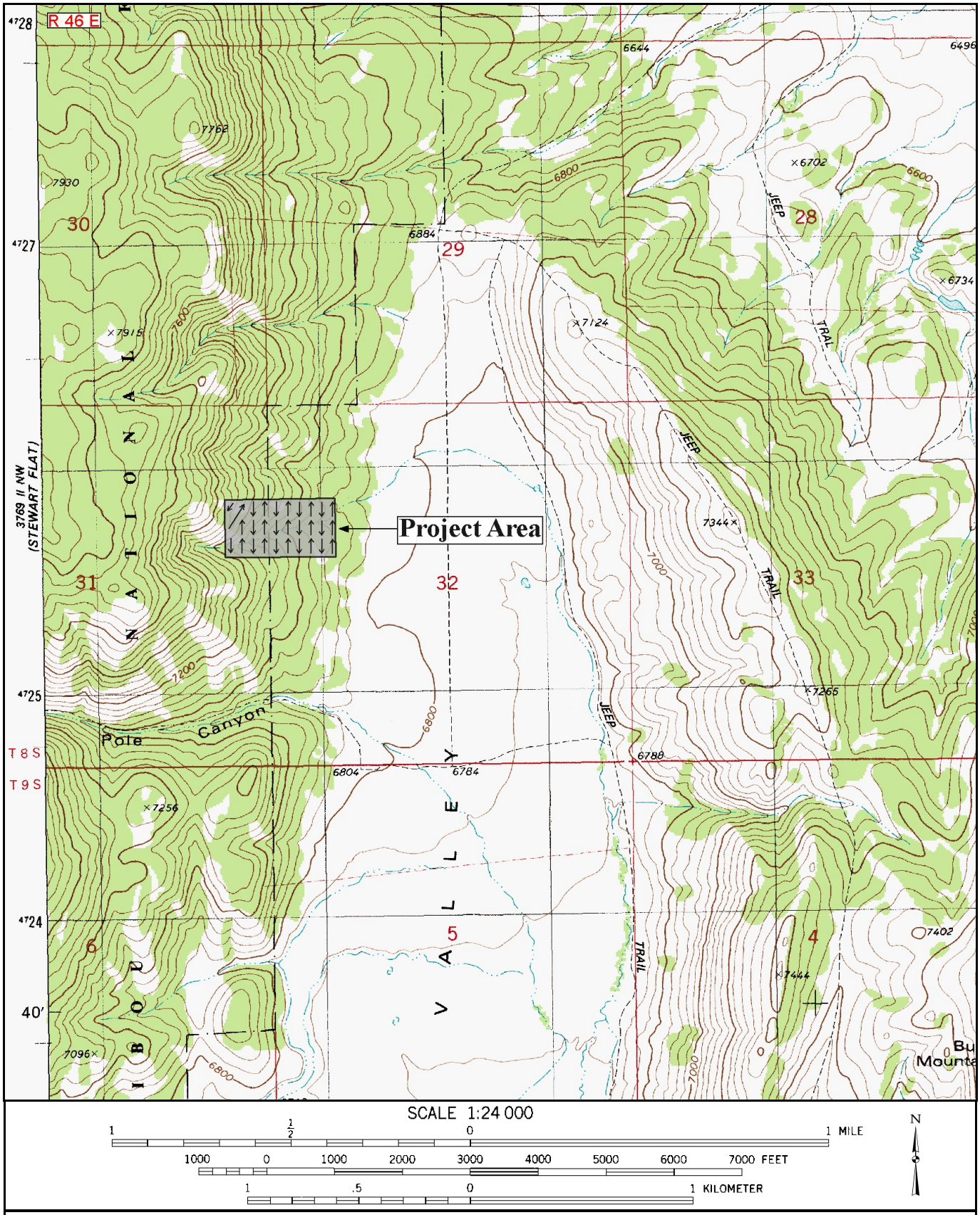


Figure 2. Location of the area surveyed for the proposed GW-29 Exploration Area, J. R. Simplot East Smoky Panel. Taken from USGS 7.5' Quadrangle Sage Valley, Idaho-Wyo. (1980). USFS Report No. CB-14-689.